Exhibit For
VYVX, LLC
Atlanta, GA
Andrew Corp. 4.5 Meter Earth Station Call Sign: E000358

Compliance with FCC Report & Order (FCC96-377) for the 13.75 - 14.0 GHz Band
Analysis and Calculations

1. Background

This Exhibit is presented to demonstrate the extent to which the VYVX, LLC satellite earth station planned for Atlanta, GA is in compliance with FCC REPORT & ORDER 96-377. The potential interference from the earth station to US Navy shipboard radiolocation operations (RADAR) and the NASA space research activities in the 13.75 - 14.0 GHz Band is addressed in this exhibit. The parameters for the earth station are:

Table 1. Earth Station Characteristics

- Coordinates (NAD83): 33° 48’ 25.0” N, 84° 20’ 28.0” W
- Satellite Location for Earth Station: TELESTAR 11 at 37.5° W
- Frequency Band: 13.75-14.0 GHz for uplink
- Polarizations: Linear
- Emissions: 3M70G7W – 36M0G7W
- Modulation: QPSK – 32APSK
- Maximum Aggregate Uplink EIRP: 70.56 dBW for all 3.7 MHz Carriers
- Maximum Aggregate Uplink EIRP: 80.4 dBW for all 36.0 MHz Carriers
- Transmit Antenna Characteristics
  - Antenna Size: 4.5 meter in Diameter
  - Antenna Type/Model: Andrew corp.
  - Gain: 54.9 dBi
- RF power into Antenna Flange: 3M70G7W
  15.66 dBW
  or –14.0 dBW/4 kHz (Maximum)
- RF power into Antenna Flange: 36M0G7W
  25.5 dBW
  or –14.0 dBW/4 kHz (Maximum)

- Minimum Elevation Angle:
  Atlanta, GA 26.9° @ 117.6° Az (Telstar-11) at 37.5° W

- Side Lobe Antenna Gain: 32 - 25*log(θ)

Because the above uplink spectrum is shared with the Federal Government, coordination in this band requires resolution data pertaining to potential interference between the earth stations and both Navy Department and NASA systems. Potential interference from the earth station could impact with the Navy and/or NASA systems in two areas. These areas are noted in FCC Report and Order 96-377 dated September 1996, and consist of (1) Radiolocation and radio navigation, (2) Data Relay Satellites.

Summary of Coordination Issues:

1) Potential Impact to Government Radiolocation (Shipboard Radar)
2) Potential Impact to NASA Data Relay Satellite Systems (TDRSS)

2. Potential Impact to Government Radiolocation (Shipboard Radar)

Radiolocation operations (RADAR) may occur anywhere in the 13.4 - 14 GHz frequency band aboard ocean going United States Navy ships. The Federal Communication Commission (FCC) order 96-377 allocates the top 250 MHz of this 600 MHz band to the Fixed Satellite Service (FSS) on a co-primary basis with the radiolocation operations and provides for an interference protection level of -167 dBW/m^2/4 kHz.

The closest distance to the shoreline from the Atlanta earth station is approximately 379 km east toward the Atlantic Ocean. The calculation of the power spectral density at this distance is given by:

3M70G7W

1. Clear Sky EIRP: 70.56 dBW
2. Carrier Bandwidth: 3M70G7W
3. PD at antenna input: -14.0 dBW/4 kHz
4. Transmit Antenna Gain: 54.9 dBi
5. Antenna Gain Horizon: FCC Reference Pattern
6. Antenna Elevation Angle: 26.9°

36M0G7W

1. Clear Sky EIRP: 80.4 dBW
2. Carrier Bandwidth: 36M0G7W
3. PD at antenna input: -14.0 dBW/4 kHz
4. Transmit Antenna Gain: 54.9 dBi
5. Antenna Gain Horizon: FCC Reference Pattern
6. Antenna Elevation Angle: 26.9°

The proposed earth station will radiate interference toward the ocean according to its off-axis side-lobe performance. A conservative analysis, using FCC standard reference pattern, results in off-axis antenna gains of -3.5 dBi towards the coastline.

The signal density at the shoreline, through free space is:

3.7 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m^2).

= -14.0 dBw/4 kHz + (3.5) dBi – 10*log[4Π*(379000m)^2]
= -143.0 dBW/m^2/4 kHz + Additional Path Losses (~87 dB)
= -230.0 dBW/m^2/4 kHz

36.0 MHz Carriers

PFD = Antenna Feed Power density (dBW/4 kHz) + Antenna Off-Axis Gain (dBi) – Spread Loss (dBw-m^2).

= -14.0 dBw/4 kHz + (3.5) dBi – 10*log[4Π*(379000m)^2]
= -143.0 dBW/m^2/4 kHz + Additional Path Losses (~87 dB)
= -230.0 dBW/m^2/4 kHz

Our calculations show additional path loss of approximately 87 dB including absorption loss and earth diffraction loss for the actual path profiles from the proposed earth station to the nearest shoreline.

The calculated PFD including additional path losses to the closest shoreline location is –230 dBW/m^2/4 kHz for the 3.7 MHz carriers and –239.4 dBW/m^2/4 kHz for the 36.0 MHz. This is below the –167 dBW/m2/4 kHz interference criteria of R&O 96-377. Therefore, there should be no interference to the US Navy RADAR from the Atlanta earth station due to the distance and the terrain blocking between the site and the shore.

3. Potential Impact to NASA's Data Relay Satellite System (TDRSS)

The geographic location of VYVX, LLC. earth station in Atlanta, GA is outside the 390 km radius coordination contour surrounding NASA's White Sands, New Mexico ground station complex. Therefore, the TDRSS space-to-earth link will not be impacted by this facility.

3.7 MHz Carriers

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 4.5 meter earth station dish will have an EIRP less than 71 dBW/6 MHz for the 3.75 MHz carriers in this band. The total EIRP for the 3.7 MHz carriers is 70.56 dBW. The equivalent EIRP per 6 MHz segment is 69.96 dBW/6 MHz. Therefore, there will be no interference to the TDRSS space-to-space link.

36 MHz Carriers

The TDRSS space-to-space link in the 13.772 to 13.778 GHz band is assumed to be protected if an earth station produces an EIRP less than 71 dBW/6 MHz in this band. The 4.5 meter earth station dish will have an EIRP greater than 71 dBW/6 MHz for the 36.0 MHz carriers in this band. The total EIRP for the 36.0 MHz carriers is 84.8 dBW. The equivalent EIRP per 6 MHz segment is 78.8 dBW/6 MHz. Therefore, there will be potential interference into the TDRSS space-to-space link.

4. Coordination Issue Result Summary and Conclusions

3.7 MHz Carriers

The results of the analysis and calculations performed in this exhibit indicate that compatible operation between the earth station at the Atlanta earth station and the US Navy and NASA systems is probable. These analyses have been based on the assumption of 3.7 MHz bandwidth digital video and/or data transmissions.

36.0 MHz Carriers

For the 36 MHz carriers, the results of the analysis and calculations performed in this exhibit indicate that compatible operations between the earth station at the Atlanta facility and the US Navy, and NASA systems space-to-earth and space-to-space links are possible.

Operation in NASA systems space-to-space link (13,772.0 to 13,778.0 MHz) will not be permitted because the EIRP of the 36 MHz carriers is 80.4 dBW. The equivalent EIRP per 6 MHz segment is 74.4 dBW/6 MHz. Therefore, there will be potential interference involving the TDRSS space-to-space link.

Operation on the 36.0 MHz carriers will be restricted to the following band.

13,779 – 14,000 MHz, these are the band edges.